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(71)Applicant : **EBARA INFILCO CO LTD**
(72)Inventor : **ITO GIICHI**

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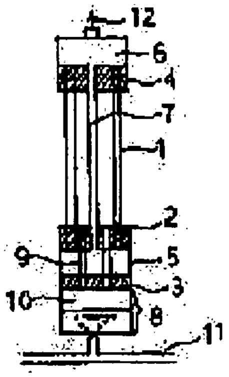
(54) HOLLOW FIBER MEMBRANE MODULE

(57)Abstract:
PURPOSE: To obtain the structure capable of uniformly and sufficiently washing the neighborhood of a membrane water collection part by bubbling.
CONSTITUTION: In the external pressure type hollow fiber membrane module arranged aproximately with a diffuser member 8 for washing, potting parts are set in two stages 2 and 3, and the water collection part 5 is set at the gap of the potting parts set in two stages, and also a diffuser tube 9 is set so as to pass through the potting parts set in two stages, and one end of the diffuser tube 9 set so as to pass through is opened to the diffuser member 8, and the other end is opened to the potting part 2 spreading the hollow fiber membrane.



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(51)Int.Cl.^{5}	識別記号	庁内整理番号	ＦＩ	技術表示箇所
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審査請求　未請求　請求項の数１　ＦＤ　（全 ３ 頁）

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(22)出願日　平成５年(1993)６月２日

(71)出願人　000000402
荏原インフィルコ株式会社
東京都港区港南１丁目６番27号

(72)発明者　伊藤　義一
東京都港区港南１丁目６番27号　荏原インフィルコ株式会社内

(74)代理人　弁理士　吉嶺　桂　（外１名）

(54)【発明の名称】　中空糸膜モジュール

(57)【要約】

【目的】　膜集水部近辺がバブリングにより均一かつ充分に洗浄できる構造の中空糸膜モジュールを提供する。

【構成】　洗浄用散気部材８を近接配備した外圧型中空糸膜モジュールにおいて、ポッティング部を２段２、３に設け、該２段に設けたポッティング部の間隙に集水部５を設けると共に、前記２段に設けたポッティング部を貫通して散気チューブ９を設置し、該貫通して設置した散気チューブ９の一端を前記散気部材８に開口し、他端を中空糸膜を張設したポッティング部２に開口したものである。

【特許請求の範囲】

【請求項１】　洗浄用散気部材を近接配備した外圧型中空糸膜モジュールにおいて、ポッティング部を２段に設け、該２段に設けたポッティング部の間隙に集水部を設けると共に、前記２段に設けたポッティング部を貫通して散気チューブを設置し、該貫通して設置した散気チューブの一端を前記散気部材に開口し、他端を中空糸膜を張設したポッティング部に開口したことを特徴とする中空糸膜モジュール。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、中空糸膜モジュールに係り、特に、河川水、湖沼水、し尿、用水及び廃水などの原水に含まれる懸濁物をろ過するための中空糸膜モジュールに関する。

【０００２】

【従来の技術】中空糸膜を用いる技術において、膜モジュールの洗浄には通常空気によるバブリングが使用されている。そして、空気によるバブリングは、従来は膜モジュールの外部より散気するのが一般的であった。外部からの散気では膜モジュールの表面のみが散気され、一番膜の閉塞が進む集水部近辺への散気が不十分であった。

【０００３】従来の片端又は両端集水型モジュールにおいて、バブリングにより濁質の剥離を行う場合、バブリング用の散気管は膜モジュールの下部に設置していた。下部に集水部がある場合、図３に示すように散気管よりの空気は下部の集水部にあたり、周囲に分散してしまうため、集水部近くのバブリングによる洗浄が充分に行えない。また、例えば図４に示すように、膜間に散気部を挿入して設置しても、膜集水部近辺に対する均一なバブリングはむずかしい。上記のように、従来の洗浄方法においては、透過流束が一番高く膜の閉塞が進む集水部近辺でのバブリング洗浄が不充分であった。

【０００４】

【発明が解決しようとする課題】本発明は、上記の従来技術の問題点を解決し、膜集水部近辺がバブリングにより均一かつ充分に洗浄できる構造の中空糸膜モジュールを提供することを課題とする。

【０００５】

【課題を解決するための手段】上記課題を解決するために、本発明では、洗浄用散気部材を近接配備した外圧型中空糸膜モジュールにおいて、ポッティング部を２段に設け、該２段に設けたポッティング部の間隙に集水部を設けると共に、前記２段に設けたポッティング部を貫通して散気チューブを設置し、該貫通して設置した散気チューブの一端を前記散気部材に開口し、他端を中空糸膜を張設したポッティング部に開口することとしたものである。

【０００６】上記中空糸膜モジュールにおいて、ポッティング部及び集水部の形状は、円形、長方形等のいずれの形状でもよく、ポッティング部の材質及び中空糸の材質とか径もいずれでも使用でき、また、散気チューブの材質も通常使用できるものがいずれでも使用でき特に制限はない。

【０００７】

【作用】本発明によれば、下部集水部の下より直接中空糸膜に散気できるため、散気した空気が集水部に阻害されることなく、膜間に直接散気した空気が進入し、中空糸膜の特に集水部近辺を中心に充分に洗浄することができるものである。

【０００８】

【実施例】以下、本発明を実施例により図面を用いて具体的に説明するが、本発明はこれに限定されない。

実施例１

図１に本発明の中空糸膜の概略断面図を示し、図２に図１のポッティング部の部分拡大図を示す。図１及び図２において、中空糸１は下部ポッティング部Ａ２と上部ポッティング部４で支持されており、下部ポッティング部Ａ２とその下の散気チューブを支持するポッティング部Ｂ３との間には密閉された集水部５が設けられ、散気チューブ９が貫通している。

【０００９】そして、中空部で処理された水は下部集水部５に集水され、集水部連絡管７を通り上部集水管６に流入して外部に排出される。処理水の排出は下部の集水部５から直接排出してもよい。ポッティング部３の下部には散気された空気を一旦受ける、空気受け部１０が設置されている。空気受け部１０は下部が開放されていれば、口径がポッティング部と同じでも広がっていても良い。散気チューブ９は２～５ｍｍ程度のチューブでポッティングＡ２とＢ３を貫通し、空気受け部１０とポッティング部２上面を連絡している。散気チューブ９はポッティング部２に対し、均一に配置されることが望ましい。散気管１１より排出された空気は一旦空気受け部１０に流入し、更に、散気チューブ９を通り、ポッティング部２上面より散気される。

【００１０】散気は中空糸膜間でかつポッティング部２より行なわれるため、ポッティング部及びその近辺に対する洗浄効果が著しく高くなる。また散気された空気は膜間を通って上昇するため、効率よく洗浄に使用され、両端集水で上部にポッティング部のある場合もポッティング部に直接上昇した空気があたるため、洗浄効果が高くなる。この実施例では、両端集水型の例を示したが、片端集水で集水部が散気管上部にある場合も同様に実施できる。

【００１１】

【発明の効果】本発明により、集水部近辺での濁質の閉塞がなくなり、閉塞による駆動圧力の上昇が最小限になる。

【図面の簡単な説明】

【図１】本発明の中空糸膜モジュールの一例を示す概略断面図。

【図２】図１の下部ポッティング部の部分拡大図。

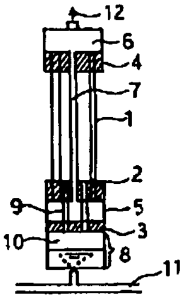
【図３】従来の散気による洗浄の説明図。

【図４】従来の散気による洗浄の説明図。

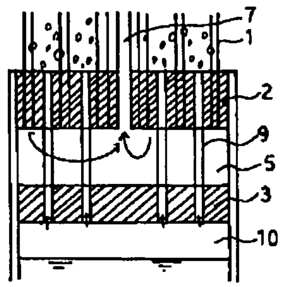
【符号の説明】

１：中空糸、２：下部ポッティング部Ａ、３：下部ポッティング部Ｂ、４：上部ポッティング部、５：集水部、６：上部集水部、７：集水部連絡管、８：散気部、９：散気チューブ、１０：空気受部、１１：散気管、１２：処理水

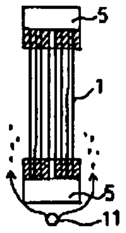
【図１】



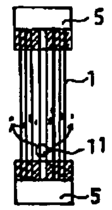
【図２】



【図３】



【図４】



JAPANESE [JP,06-343837,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]
[Claim 1] While preparing the catchment section in the gap of the potting section which prepared the potting section in two steps and was established in these two stages in the external pressure mold hollow fiber module which carried out contiguity disposition of the aeration member for washing The hollow fiber module characterized by having penetrated the potting section prepared in said two steps, having installed the aeration tube, having carried out opening of the end of the aeration tube this penetrated and installed to said aeration member, and carrying out opening of the other end to the potting section which stretched the hollow fiber.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to a hollow fiber module, and relates to the hollow fiber module for filtering the suspended solid especially contained in raw water, such as river water, lake water, nightsoil, service water, and waste water.
[0002]
[Description of the Prior Art] In the technique using a hollow fiber, bubbling with air is usually used for washing of a membrane module. And as for bubbling with air, it was conventionally more common than the exterior of a membrane module to have carried out aeration. The aeration from the outside of the aeration to the catchment section neighborhood to which aeration only of the front face of a membrane module is carried out, and membranous lock out goes most was inadequate.
[0003] In conventional one end or an ends catchment mold module, when exfoliating a suspended matter by bubbling, the powder trachea for bubbling was installed in the lower part of a membrane module. When the catchment section is in the lower part, since the air from a powder trachea is around distributed in the lower catchment section as shown in drawing 3 , washing by bubbling near the catchment section cannot fully be performed. Moreover, as shown, for example in drawing 4 , even if it inserts and installs the aeration section between film, uniform bubbling to the film catchment section neighborhood is difficult. As mentioned above, in the conventional washing approach, bubbling washing in the catchment section neighborhood to which transparency flux is the highest and membranous lock out progresses was inadequate.
[0004]
[Problem(s) to be Solved by the Invention] This invention solves the trouble of the above-mentioned conventional technique, and makes it a technical problem for the film catchment section neighborhood to offer homogeneity and the hollow fiber module of structure which can fully be washed by bubbling.
[0005]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, while preparing the catchment section in the gap of the potting section which prepared the potting section in two steps in the external pressure mold hollow fiber module which carried out contiguity disposition of the aeration member for washing, and was established in these two stages by this invention Suppose that penetrate the potting section prepared in said two steps, an aeration tube is installed, opening of the end of the aeration tube this penetrated and installed is carried out to said aeration member, and opening of the other end is carried out to the potting section which stretched the hollow fiber.
[0006] In the above-mentioned hollow fiber module, which configurations, such as circular and a rectangle, are sufficient as the configuration of the potting section and the catchment section, what can also use [any or] the construction material of the potting section and the construction material of a hollow filament, and a path, and can also usually use the construction material of an aeration tube can use either, and there is especially no limit.
[0007]
[Function] Without according to this invention, the air which carried out aeration being checked by the

catchment section since aeration can be carried out to the lower twist direct hollow fiber of the lower catchment section, the air which carried out direct aeration advances between film, and it is the thing of a hollow fiber which can fully be especially washed centering on the catchment section neighborhood.

[0008]

[Example] Hereafter, although an example explains this invention concretely using a drawing, this invention is not limited to this.

The outline sectional view of the hollow fiber of this invention is shown in example 1 drawing 1 , and the elements on larger scale of the potting section of drawing 1 R> 1 are shown in drawing 2 . In drawing 1 and drawing 2 , it is supported in the lower potting section A2 and the up potting section 4, the sealed catchment section 5 was formed between the lower potting section A2 and the potting section B3 which supports the aeration tube under it, and the aeration tube 9 has penetrated the hollow filament 1.

[0009] And water is caught by the lower catchment section 5, and the water processed by the centrum flows into the up catchment tubing 6 through the catchment section crossfire tube 7, and is discharged outside. Blowdown of treated water may be directly discharged from the lower catchment section 5. The air receiver section 10 which once receives the air by which aeration was carried out is installed in the lower part of the potting section 3. as long as the lower part is opened, even if the aperture of the air receiver section 10 is the same as that of the potting section, it may spread. The aeration tube 9 penetrates potting A2 and B3 by the about 2-5mm tube, and is connecting air receiver section 10 and potting section 2 top face. As for the aeration tube 9, it is desirable to be arranged to the potting section 2 at homogeneity. The air discharged from the powder trachea 11 once flows into the air receiver section 10, more nearly further than potting section 2 top face, it passes along the aeration tube 9 and aeration is carried out.

[0010] Since aeration is between hollow fibers and is performed from the potting section 2, the potting section and the cleaning effect over the neighborhood of it become remarkably high. Moreover, since the air which went up directly hits the potting section also when it is efficiently used for washing and the potting section is in the upper part by ends catchment, since the air by which aeration was carried out goes up through between film, a cleaning effect becomes high. In this example, although the example of an ends catchment mold was shown, when the catchment section is in the powder trachea upper part by one end catchment, it can carry out similarly.

[0011]

[Effect of the Invention] By this invention, lock out of the suspended matter in the catchment section neighborhood is lost, and lifting of the driving pressure force by lock out becomes the minimum.

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TECHNICAL FIELD

[Industrial Application] This invention relates to a hollow fiber module, and relates to the hollow fiber module for filtering the suspended solid especially contained in raw water, such as river water, lake water, nightsoil, service water, and waste water.

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PRIOR ART

[Description of the Prior Art] In the technique using a hollow fiber, bubbling with air is usually used for washing of a membrane module. And as for bubbling with air, it was conventionally more common than the exterior of a membrane module to have carried out aeration. The aeration from the outside of the aeration to the catchment section neighborhood to which aeration only of the front face of a membrane module is carried out, and membranous lock out goes most was inadequate.
[0003] In conventional one end or an ends catchment mold module, when exfoliating a suspended matter by bubbling, the powder trachea for bubbling was installed in the lower part of a membrane module. When the catchment section is in the lower part, since the air from a powder trachea is around distributed in the lower catchment section as shown in drawing 3 , washing by bubbling near the catchment section cannot fully be performed. Moreover, as shown, for example in drawing 4 , even if it inserts and installs the aeration section between film, uniform bubbling to the film catchment section neighborhood is difficult. As mentioned above, in the conventional washing approach, bubbling washing in the catchment section neighborhood to which transparency flux is the highest and membranous lock out progresses was inadequate.

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

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MEANS

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, while preparing the catchment section in the gap of the potting section which prepared the potting section in two steps in the external pressure mold hollow fiber module which carried out contiguity disposition of the aeration member for washing, and was established in these two stages by this invention Suppose that penetrate the potting section prepared in said two steps, an aeration tube is installed, opening of the end of the aeration tube this penetrated and installed is carried out to said aeration member, and opening of the other end is carried out to the potting section which stretched the hollow fiber.
[0006] In the above-mentioned hollow fiber module, which configurations, such as circular and a rectangle, are sufficient as the configuration of the potting section and the catchment section, what can also use [any or] the construction material of the potting section and the construction material of a hollow filament, and a path, and can also usually use the construction material of an aeration tube can use either, and there is especially no limit.

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OPERATION

[Function] Without according to this invention, the air which carried out aeration being checked by the catchment section since aeration can be carried out to the lower twist direct hollow fiber of the lower catchment section, the air which carried out direct aeration advances between film, and it is the thing of a hollow fiber which can fully be especially washed centering on the catchment section neighborhood.

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EXAMPLE

[Example] Hereafter, although an example explains this invention concretely using a drawing, this invention is not limited to this.
The outline sectional view of the hollow fiber of this invention is shown in example 1 drawing 1 , and the elements on larger scale of the potting section of drawing 1 R> 1 are shown in drawing 2 . In drawing 1 and drawing 2 , it is supported in the lower potting section A2 and the up potting section 4, the sealed catchment section 5 was formed between the lower potting section A2 and the potting section B3 which supports the aeration tube under it, and the aeration tube 9 has penetrated the hollow filament 1.
[0009] And water is caught by the lower catchment section 5, and the water processed by the centrum flows into the up catchment tubing 6 through the catchment section crossfire tube 7, and is discharged outside. Blowdown of treated water may be directly discharged from the lower catchment section 5. The air receiver section 10 which once receives the air by which aeration was carried out is installed in the lower part of the potting section 3. as long as the lower part is opened, even if the aperture of the air receiver section 10 is the same as that of the potting section, it may spread. The aeration tube 9 penetrates potting A2 and B3 by the about 2-5mm tube, and is connecting air receiver section 10 and potting section 2 top face. As for the aeration tube 9, it is desirable to be arranged to the potting section 2 at homogeneity. The air discharged from the powder trachea 11 once flows into the air receiver section 10, more nearly further than potting section 2 top face, it passes along the aeration tube 9 and aeration is carried out.
[0010] Since aeration is between hollow fibers and is performed from the potting section 2, the potting section and the cleaning effect over the neighborhood of it become remarkably high. Moreover, since the air which went up directly hits the potting section also when it is efficiently used for washing and the potting section is in the upper part by ends catchment, since the air by which aeration was carried out goes up through between film, a cleaning effect becomes high. In this example, although the example of an ends catchment mold was shown, when the catchment section is in the powder trachea upper part by one end catchment, it can carry out similarly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The outline sectional view showing an example of the hollow fiber module of this invention.
[Drawing 2] The elements on larger scale of the lower potting section of drawing 1 .
[Drawing 3] The explanatory view of washing by the conventional aeration.
[Drawing 4] The explanatory view of washing by the conventional aeration.
[Description of Notations]
1: A hollow filament, the 2:lower potting section A, the 3:lower potting section B, the 4:up potting section, 5:catchment section, the 6:up catchment section, 7:catchment section crossfire tube, 8:aeration section, 9:aeration tube, 10:air receiving part, 11:powder trachea, 12 : treated water

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[Translation done.]

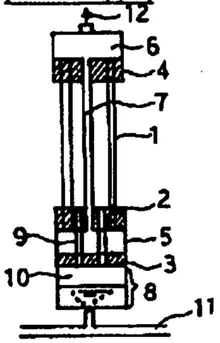
* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

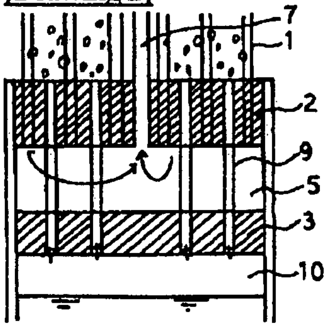
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

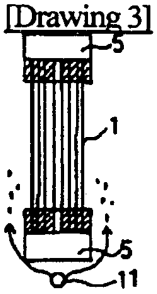
[Drawing 1]



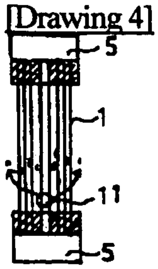
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]